

# **RADIOLOGICAL EMERGENCY INFORMATION FOR**



# **FARMERS, FOOD PROCESSORS AND DISTRIBUTORS**



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This booklet has been prepared by the Massachusetts Department of Public Health to provide guidance to members of the agricultural community with farms, food processing facilities and distributing facilities within 50 miles of a nuclear power station. It explains the actions which you may be advised to take in order to protect your livestock and crops in the event of a radiological emergency. Please read and become familiar with the information in this booklet. Keep it in a convenient place for future reference.

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## HOW WILL YOU BE NOTIFIED IN AN EMERGENCY?

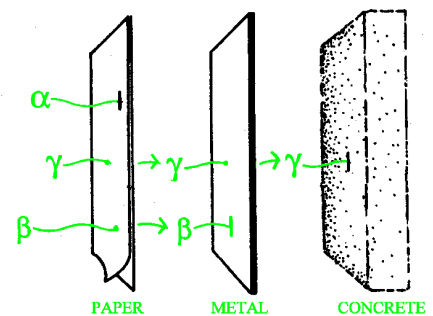
In the event of an emergency, state and local officials, through the Emergency Alert System (EAS), will advise you of the necessary precautions to take. If the emergency may effect farming, food processing and distributors in your area, specific instructions from the Massachusetts Department of Public Health will be issued over the EAS by state officials. In the towns within the 10-mile Emergency Planning Zone, the sounding of sirens will advise people to tune into the Emergency Alert System. In Massachusetts all radio stations are advised to carry EAS messages during an emergency. Additionally, the major EAS stations for the three Emergency Planning Zones are: Seabrook Station - FM 92.5, 93.7, and AM 1450; Vermont Yankee - FM 93.1, 95.3 and 98.3, and, Pilgrim Station - FM 95.9, 98.5, and 99.1.

## UNDERSTANDING RADIATION

Radiation is energy in motion- it is tasteless, odorless and invisible. Naturally occurring radioactive materials are present in our bodies, in our homes, in the soil, and in the food and water we consume. Radioactive gases are also present in the air we breathe. These naturally occurring forms of radiation are referred to as “background radiation” and account for more than half of the exposure we receive.

In addition to natural background radiation, there are other sources of exposure. The largest source of radiation exposure to the average individual comes from the medical and dental use of X-rays and from the use of radioactive materials to diagnose and treat disease.

Radiation that produces charged particles of “ions” as it moves through materials it strikes is called “ionizing” radiation. Alpha, beta, gamma radiation and X-rays are all forms of ionizing radiation. Alpha particles can be stopped by a sheet of paper. Beta particles can be stopped by a thin sheet of metal. Gamma rays are the most penetrating and can be stopped by concrete or lead.



## EFFECTS OF RADIATION EXPOSURE

The harm that can come to you from radiation will depend on the nature and energy level of the radiation to which you are exposed, the length of time you are exposed to it, how much of your body is exposed, and how much radioactive material is collected in your body.

### TYPICAL RADIATION EXPOSURE LEVELS

Sources and amounts of Radiation  
(average amounts in millirem)

Air-Food-Water	36/yr
The Earth (Atlantic Coast)	16/yr
Indoor radon	200-300/yr *
Chest X-ray	20/test
Round trip, coast-to-coast plane trip	4/trip
Living next to a nuclear power plant	less than 1/yr

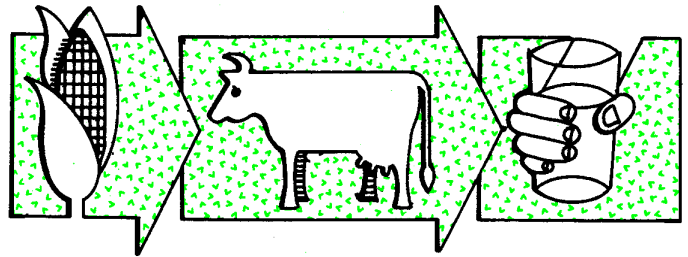
\*Actual dose can vary greatly depending on such factors such as how well a house is ventilated.

The biological effect of radiation on man is measured in units called millirems. The average person receives about 360 millirems a year from background radiation. Man-made sources such as dental and medical X-rays can contribute, on the average, another 60 millirem per year. These amounts are not considered to be of any significance to your health. The average exposure to people due to nuclear power plant operations is less than .1 millirem per year.

## RELEASE OF RADIOACTIVE MATERIAL FROM A POWER PLANT

A release of radioactivity from a power plant in an accident could send tiny particles and gases into the environment. The particles would be spread by the wind and eventually fall to the earth. The actual distance that radioactive particles would travel depends primarily on weather conditions. Heavier particles would fall quickly near the point of release. Strong winds could spread lighter particles over a larger area, greatly reducing the concentration of radiation. Rain would increase the rate at which the particles fall to earth and the levels of radioactivity might be higher.

## CONTAMINATION



Contamination is the presence of radioactive materials in unwanted locations. People, animals, plants, soil and farm equipment can be contaminated.

People and animals can be exposed to radiation internally and externally. External contamination is caused by radioactive particles lying on the surface of an object. People and animals can be internally contaminated by breathing radioactive particles in the air, by eating contaminated food, or by drinking contaminated water or milk. Therefore, it is necessary to take special precautions with farm animals to prevent contamination from entering the food chain. Plants can become contaminated internally by absorbing radioactive particles contained in the soil or water.

If radioactive material is deposited on a person's skin, or if radioactive materials have entered a person's body, the person is then considered to be contaminated. Outer skin surface can be washed or decontaminated. Radioactive material that is ingested may result in long-term exposure which is a more significant health concern.

## HOW LONG CAN RADIATION BE HARMFUL?

Radioactive materials decay away at specific rates. Exposure from radiation is greatest during the first few days following the deposition of radioactive materials. Those materials that remain in the air for longer periods of time lose much of their radioactivity before they settle to earth. The radiation intensity decreases with the passage of time as the radioactive materials decay.

## IF THERE IS AN EMERGENCY WHO WILL PROVIDE GUIDANCE?

Upon notification of a radiological emergency affecting the state, the Radiation Control Program of the Massachusetts Department of Public Health will dispatch radiation monitoring and sampling teams. Extensive monitoring during and after a release of radiation would determine the exact location that might be contaminated, and appropriate actions to take. Emergency information and instructions will be provided to the public over the

Emergency Alert System and other means. Specific instructions concerning restriction of trade, special washing or preparation of food and dairy products, precautionary measures, as well as additional protective actions will be supplied to you, either in person or in writing, through your contacts in the distribution chain. These instructions will include actions to follow to protect yourself, your family, your livestock, and your crops.

State and local officials will keep all farmers, food processors and distributors in the affected area informed of major developments concerning the radiological emergency.

## **PERSONAL SAFETY**

Depending upon the amount and type of radioactive material deposited, there may be a period of time when it would not be safe to cultivate the land. You may be able to work your farm by taking special precautions. The Radiation Control Program of the Massachusetts Department of Public Health will monitor the area and issue instructions. You may be advised to take the following precautions:

1. Wear protective clothing (such as that worn during pesticide applications) when working outdoors. Remove outer clothing before entering your home.
2. Wear a dust filter over your nose and mouth if you are plowing, cultivating dry land, or harvesting corn.
3. Wash exposed areas of your skin before eating or drinking.

## **WHY IS WATER AND FEED THAT AN ANIMAL EATS DURING A RELEASE OF CONCERN?**

When meat and dairy animals eat or drink contaminated feed or water, some radioactive materials are passed along to the food chain through the eggs, meat or milk. Therefore it is important to protect farm animals as much as possible to limit the possibility of contaminating part of the food chain and endangering the public.

## **PROTECTIVE ACTIONS**

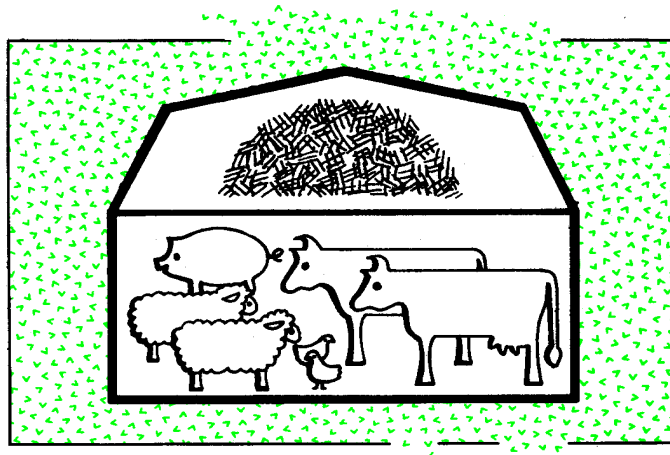
In the event of an emergency, the U.S. Food and Drug Administration (FDA) recommends levels of action to protect food, milk, and water from radioactive contamination.

With the exception of placing milk-producing animals on protected feed and water, decisions to recommend preventive and emergency protective actions will be based on verified measured levels of contamination in food and water samples, as well as the consideration of the health, economic and social aspects of such actions.

## **SHELTERING ANIMALS**

You may be asked to shelter your farm animals and give them protected feed and water. This will help prevent contamination from harming your animals, and from entering the human food supply.

One way of protecting your animals is to provide them with shelter. Dairy cattle and milk-producing animals should be sheltered first as these animals can pass contamination on to man through their milk. Secondary consideration should be given to egg-producing fowl, breeding stock, other livestock and poultry.



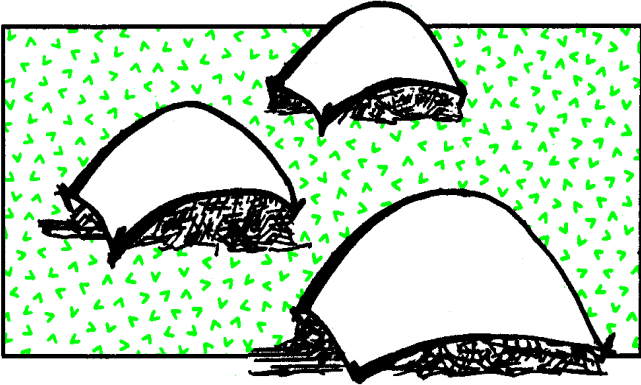
Barns, milking parlors, machine sheds, garages, corn cribs, and swine or poultry buildings are all possible livestock shelters. Generally, masonry or concrete buildings offer the best protection. An open building, such as a pole barn, provides the least protection.

Although a ventilation system is needed to keep sheltered livestock healthy, it could allow radioactive material to enter the building. Therefore, it is important to limit outside air entering the building to the minimum amount necessary for the animals' safety. Do not use fans for ventilation unless absolutely necessary. If you must use fans, set them on low speed to reduce air intake and use available filters to cover air intakes.

## ***GIVING ANIMALS PROTECTED FEED***

You may be advised to place animals on protected feed and water that have not been stored in the open or exposed to radioactive contamination. Types of protected feed include:

- Grain stored in covered bins
- Hay stored in a barn or covered shed
- Ensilage stored in covered silo
- Hay bales covered by a tarp or barrier plastic, or bales with the outer layers discarded



## ***GIVING ANIMALS PROTECTED WATER***

Animals need water to survive. Even if you have no protected feed during a radiological emergency, animals can live for several days on water alone. Water from enclosed wells, or other covered or underground sources, normally will be safer for livestock, it is unlikely these water supplies will be affected.

Radiological contamination generally travels very slowly through the ground. Open water troughs should be drained, rinsed and refilled after notification that radioactive materials have settled to the ground. The same procedure should be followed after windy weather spreads dust in the area.

## ***PROTECTING WATER SOURCES***

Open sources of water, such as rain barrels and tanks, should be covered to prevent contamination. Water in an open source should not be used unless shown to be safe. State and local health experts will check water supplies and tell you whether they are safe.

Filler pipes should be disconnected from storage containers supplied by runoff from roofs or other surface drain fields. This will help prevent contaminants from entering the storage containers.

Intake valves on water systems should be closed when you suspect the water source may be contaminated. This will prevent distributions or irrigation until the water is tested and found to be safe.

## ***PROTECTION FROM CONTAMINATED SOIL***

If state officials find that the soil is contaminated above established safety levels, proper soil management procedures can reduce contamination to safe levels. Idling—the non-use of the land for a specific period of time—may be necessary. In situations involving highly contaminated soil, removal and disposal of the soil may be more appropriate.

Alternative crops may also be recommended in some situations. Crops such as cotton and flax could be substituted for food crops because they contribute little or no radioactive material to the human diet.

Deep-plowing the soil will move radioactive substances below the plant root level, prevent plants from taking up contaminated nutrients, and allow the level of radioactivity to decrease with the passage of time.

## ***PROTECTION FROM CONTAMINATED FOOD PRODUCTS***

The following specific actions may be advised to reduce the danger of ingesting adulterated food products:

### ***Milk:***

Remove dairy animals from pasture, shelter if possible, and provide them with protected feed and water. If dairy products are found to be contaminated, it may be recommended that milk and milk products be withheld from the market.

### ***Poultry and Poultry Products:***

Poultry raised outdoors, especially those kept from egg production, should be monitored by taking samples and performing laboratory tests to determine the presence of radioactive contamination. Poultry raised indoors and given protected feed and water not likely to be contaminated.

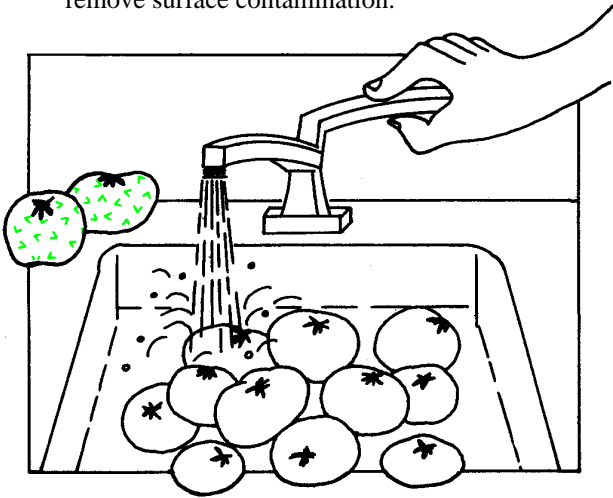
### ***Grains:***

If grains are permitted to grow to maturity, the wind and rain will probably remove most contamination. Milling or polishing will probably remove any remaining contamination. Sampling and laboratory analysis will determine if the grain is safe to use. When harvested, adulterated and unadulterated grains should be stored separately.



### **Vegetables and Fruits, Including Grapes:**

Wash, scrub, peel, or shell locally grown fruits and vegetables, including roots, tubers and grapes, to remove surface contamination.



### **Meat and Meat Products:**

If there is a release of radioactive materials into the environment, you may be advised to place meat animals on protected feed and water and, if possible, provide them with shelter. If livestock consume feed and water contaminated with radioactive materials, some of the contamination will be absorbed into their bodies and could then enter the human food supply through meat and meat products.

### **Bees:**

Honey and beehives will need to be sampled and analyzed.

### **Fish:**

Fish may continue to be harvested. Dilution of the radioactive material in large bodies of water should make adulteration of fish highly unlikely. Samples of water and fish from open bodies of water will be analyzed to ensure they are safe.

## **PROTECTION FROM PACKAGED FOOD PRODUCTS**

Food in finished packaging should not be harmful to eat as long as the outer wrappings are discarded. Radioactivity will travel on fine particles, which may coat the outside of the food product container.

## **FOOD, MILK PROCESSORS, WAREHOUSES, AND COMMODITY TERMINALS**

Windows and vents to the outdoors should be closed. Vacuum systems should be shut down, as should

compressed air systems. Any system that draws air from the outdoors to the inside should be shut down.

The Massachusetts Department of Public Health or the Massachusetts Department of Food and Agriculture will tell you when it is safe to harvest and market your fruits and vegetables.

## **BUILDINGS AND EQUIPMENT**

Monitoring by the Massachusetts Department of Public Health would determine whether any buildings or equipment were contaminated. If so, you would be advised on decontamination procedures. You may be told to wear protective clothing and wash down your buildings and equipment with soap and water. Cleaning does not destroy radioactivity but it does remove it from areas where people could be exposed.

## **THE SOIL**

The Massachusetts Department of Public Health will take soil samples to determine if your farm is safe to work or if any other precautions are necessary. It may be necessary to keep the land fallow for several weeks. The length of time would depend on the amount and type of radioactive material deposited. After that, the land could be returned to normal use. State and local officials will advise you on the use of your land after an emergency.

## **BE PREPARED**

Here are some things you can do now to prepare for an emergency:

1. Read and understand this brochure and keep it in a convenient place.
2. Plan where you would shelter your animals. Decide which animals would require immediate shelter.
3. Decide how you would provide your livestock and poultry with stored feed and water.
4. Plan for storing or processing milk if marketing must be delayed for a few days.
5. For your information, the Food and Agriculture telephone number is (617) 626-1700, Monday through Friday, 8:45 AM - 5 PM.

For more information, write or call:

Radiation Control Program  
Massachusetts Department of Public Health  
174 Portland Street, 5<sup>th</sup> Floor  
Boston, MA 02114  
(617) 727-6214

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